

TECHNOLOGY NEEDS/OPPORTUNITIES STATEMENT
ESTABLISHING TECHNICAL BASIS FOR SOCIO-ECONOMIC RISK
ASSESSMENTS

Identification No.: RL-SS45

Date: September 2001

Program: Environmental Restoration

OPS Office/Site: Richland Operations Office/Hanford Site

Operable Unit(s): Broad need potentially applicable to multiple operable units.

PBS No.: RL-SS04 (RL-VZ01)

Waste Stream: Disposition Map Designations: ER-04 [technical risk score 3], ER-14 [technical risk score 5], ER-03 [technical risk score 3]

TSD Title: N/A

Waste Management Unit (if applicable): N/A

Facility: N/A

Priority Rating:

This entry addresses the “Accelerated Cleanup: Paths to Closure (ACPC)” priority:

- X 1. Critical to the success of the ACPC
- 2. Provides substantial benefit to ACPC projects (e.g., moderate to high lifecycle cost savings or risk reduction, increased likelihood of compliance, increased assurance to avoid schedule delays)
- 3. Provides opportunities for significant, but lower cost savings or risk reduction, and may reduce uncertainty in ACPC project success.

Need Title: Establishing Technical Basis for Socio-Economic Risk Assessments

Need/Opportunity Category: Technology Need.

Need Description: This need addresses specific technical gaps identified in the scope of the Groundwater/Vadose Zone Integration Project (Integration Project) at the Hanford Site and is written as an “integrated” need. The Integration Project is focused on providing the scientific and technical basis to ensure that Hanford Site decisions, including decisions related to long-term stewardship, are defensible and possess an integrated perspective for the protection of the water resources, the Columbia River, river-dependent life, and users of the Columbia River resources. As such, this “integrated” need summarizes a number of S&T components that together address a specified technical gap. Individual efforts applied to resolve the technical gaps described in this need may address all or part of the components identified for this need. Where a specific technology need can be defined separately from an “integrated” need, a specific technology need statement has been written and is included elsewhere in the Hanford Site STCG Subsurface

Contamination Needs (e.g., RL-SS25: Improved, Cost-Effective Methods for Subsurface Access to Support Characterization and Remediation).

This need outlines improved techniques and information required for the inclusion of economic risk to the decision-making process. Economic impacts can occur directly from changes in human and ecological health due to exposure to contamination, or impacts can occur indirectly due to “ripple effects” from the former impacts. Economic impacts do not result until risks are perceived. The first step is to determine at what point does the level of environmental risk begin to influence the behavior of people such as consumers, producers, recreational fisherman, and sailboarders, for example. The points, or trigger mechanisms, are then applied to examine how the potential exposure of the environment to Hanford-derived contaminants influences economic market and non-market behavior as well as social activities. Specific activities for this need include the following:

- Improved methods are needed to predict how residents, recreationists, consumers of agricultural products and other stakeholder groups process and respond to information concerning risks posed by environmental contamination.
- Techniques and information that accurately quantify Columbia River-based recreation and other social values are needed to calibrate economic and health effects models.
- Process-oriented non-monetary cardinal and ordinal metrics need to be developed so that the competing preferences for non-market resources or alternative ecological scenarios for mitigation can be evaluated and ranked by the various stakeholder groups and a best alternative could be identified for each.
- Improved benefit transfer methodology for developing estimates of economic benefit associated with specific natural or non-market resources are needed.

Schedule Requirements:

Earliest Date Required: 8/1/99

Latest Date Required: 9/30/05

The Integration Project S&T roadmap (DOE 2000) indicates that the information is required to be implemented as part of the System Assessment Capability, Revision 2, and therefore need to be completed by FY 2004.

Problem Description: This need falls under the Risk Technical Element within the S&T Endeavor. The Risk Technical Element will provide an assessment of the potential risks to the environment, human health, economic and socio-cultural quality of life from Hanford-derived contaminants. Economic assessments have begun to appear in EPA’s publications on environmental decision-making (EPA 1999) and stakeholders have requested the inclusion of this information for their participation in Hanford activities (DOE 1998). At this time there is little understanding of the triggers for economic impacts, and even less understanding of the non-market resource evaluations. This need addresses methodologies for better understanding economic risk at the Hanford Site and surrounding areas.

Benefit to the Project Baseline of Filling Need: Filling the gap in knowledge associated with Hanford-derived contaminants and economic impact parameters will decrease the uncertainty attached

to the economic risk assessment results in the System Assessment Capability. There is a clear indication that economic risk assessment will be used in decision making. Hanford Site stakeholders have indicated that economic risk is required for consideration in decisions about the site (DOE 1998) and EPA's Science Advisory Board has included economic risk in a recent publication on uncertainty and decision-making.

Functional Performance Requirements: This need must be addressed by providing the technical basis for trigger mechanisms in the economic risk assessment process.

Work Breakdown

Structure (WBS) No. : 1.4.03.4.4

TIP No.: TIP-0016

Relevant PBS Milestone: PBS-MC-042

Justification For Need:

Technical: There is currently insufficient knowledge of how the potential exposure of Hanford-derived contaminants influences economic market and non-market behavior as well as social activities. This science need addresses collection of information to be used in future economic assessments

Regulatory: Economic assessments are indirectly related to regulatory requirements at the Hanford Site. Information obtained by addressing this need will provide more information for making site regulatory decisions.

Environmental Safety & Health: This need is indirectly related to environmental safety and health issues in that the consequences of activities that jeopardize safety and health will result in economic impacts.

Potential Life-Cycle Cost Savings of Need (in \$000s) and Cost Savings Explanation:

The estimated life-cycle cost savings associated with filling this need is \$200M. This estimate is based on an assumed savings of 5% of the total Hanford remediation life-cycle cost of >\$5B. Estimated savings are due to information and data gained by filling this need that supports decisions for cost effective remediation and long-term stewardship.

Cultural/Stakeholder Concerns: There is great concern in the stakeholder community to include economic risk in Hanford Site remedial decisions. This need addresses the social and economic assessment requirements that were expressed in "Columbia River Comprehensive Impact Assessment, Part II: Requirements for a Columbia River Comprehensive Impact Assessment" (DOE 1998).

Other: None.

Current Baseline Technology: N/A

End-User: Richland Environmental Restoration Project

Site Technical Point-of-Contact: Scott W. Petersen, BHI, (509) 372-9126; Mark D. Freshley, PNNL, (509) 372-9568; Michael J. Truex, PNNL, (509) 376-5461

Contractor Facility/Project Manager: Michael J. Graham, BHI, (509) 372-9179

DOE End-User/Representative Point-of-Contact: John G. Morse, DOE-RL, (509) 376-0057

References:

DOE, 1998, *Screening Assessment and Requirements for a Comprehensive Assessment: Columbia River Comprehensive Impact Assessment*, DOE/RL-96-16, Revision 1, U.S. Department of Energy, Richland, Washington.

United States Department of Energy. 2000. Groundwater/Vadose Zone Integration Project Science and Technology Summary Description. DOE/RL-98-48, Vol. III, Rev. 1, U.S. Department of Energy, Richland, Washington.

EPA, 1999, Integrated Environmental Decision-Making in the 21st Century, Report from the EPA Science Advisory Board's Integrated Risk Project, EPA-SAB-EC-99-018, Peer Review Draft, May 3, 1999, U.S. Environmental Protection Agency, Washington, D.C.